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scant twenty to forty miles. These represent the western-most extensions of species, all of which are much more abundant farther eastward or southward. White oak, black jack oak, laurel oak and pin oak are very rare within that area. Yellow oak, low yellow oak and swamp white oak are relatively abundant in a very few localities.

The ecological relations controlling these distributional phenomena are quite well known. The major ecological factors indicate a very decided advancement toward an increased xerophytism extending westward and northward from the southeastern corner of the state.

LINCOLN, NEBRASKA,
December, 1919.

SHORTER NOTES

THE PAPER MULBERRY (*Broussonetia*) AN "ARTILLERY PLANT."—A number of the Nettle Family (*Urticaceae*) are known to eject the pollen forcibly, one of these plants (*Pilea serpyllifolia* Wedd., or *P. muscosa* Lindl.) being often cultivated under the name "artillery plant" because of the curious explosive opening of the staminate flowers. Particularly when the plants are placed in sunlight, after having been sprinkled, the pollen is forcibly thrown out in a smoky cloud, reminding one of the bursting of miniature shells or bombs.

I was much interested last spring to find that the Paper Mulberry (*Broussonetia papyrifera* Vent.) has the same habit of throwing its pollen as has the *Pilea*. It is interesting to recall, also, that these plants are in closely related families, the *Moraceae* and *Urticaceae* having much in common. The 21st of May, 1919, in Philadelphia was a warm showery day, the frequent thunderstorms alternating with bright hot sunshine, and the paper mulberries, dripping after a shower, presented a curious spectacle in the bright sunlight. There was a continuous succession of puffs of smoky pollen from various parts of the tree, apparently all the flowers in a catkin exploding at once and filling the air with yellow "smoke" to a radius of about an inch in all directions, after which the pollen drifted lazily away on the gentle breeze.

Presumably here, as in *Pilea* (see Jost, Plant Physiology, English Edit., 1907, p. 425), osmotic pressure tears an anther loose from the base of the stamen, the filament straightening with sufficient force to throw out the pollen. The staminate flowers are in a rather compact catkin and it is likely that the jar of one stamen straightening and bursting is enough to set off the other flowers; at any rate, examination of a catkin after an explosion shows generally that all of the flowers have been sprung and the pollen thrown out.

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REVIEWS

Knowlton's Mesozoic and Cenozoic Plants of America*

Those who have had occasion to deal with American Cretaceous or Tertiary plants have long used and valued Dr. Knowlton's Catalogue published in 1898, which brought together the scattered records in the most convenient form. The new Catalogue, a work of 815 pages, enumerates all the Mesozoic and Cenozoic species, including, as Dr. Knowlton informs me, no less than 4,789 accepted forms. The fossil plants of Greenland and Mexico are excluded, but those of Alaska are fully cited. In its form and arrangement the new Catalogue resembles the old, but it differs in having a series of extremely useful appendices. The first of these gives the classification of all the genera in orders, families, etc.; the second an index of genera and families in the classification; the third enumerates the plants of each formation, from the Triassic to the Pleistocene. The amount of labor represented is enormous, but the saving to others is much greater. My annotated copy of the old list, and my imperfect attempts to cover the ground represented by the appendices, look rather pathetic by the side of this vastly more complete and satisfactory work. We can only hope that with this new aid the very small band of American paleobotanists will be

* Knowlton, F. H., A Catalogue of the Mesozoic and Cenozoic Plants of North America, U. S. Geological Survey, Bulletin 696, 1919 (published early in 1920; received at Boulder, Feb. 18).